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1 Apparatus for holding a catheter bag

2

3 The present invention relates to medical apparatus. More
4 particularly the present invention relates to apparatus
5 for holding a catheter or drip bag, which can be used to
6 detect when the contents of the bag reach a certain
7 level, and to report when the bag requires emptying or
8 filling.

9

10 A catheter is a thin and flexible tube inserted into a
11 bodily passage or cavity in order to allow fluids to pass
12 into or out of it. The catheter is generally connected to
13 a catheter bag, which collects the fluids passing out, or
14 a drip bag which stores the fluids passing into the body.
15 Catheterisation is commonly used in hospitals, care homes
16 and medical centres for seriously ill patients, or those
17 who are confined to a bed or wheelchair.

18

19 As catheter or drip bags have a finite capacity (usually
20 around 2000 ml) nursing and/or care staff must check the
21 bags on a regular basis, to empty them if full or to fill
22 them if empty.

23

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1 Where the catheter is being used for excretion
2 collection, i.e. for the passage of fluids out of the
3 body, overfilling of the catheter bag can cause a
4 backflow through the tubing and back into the body, and
5 particularly into the bladder and kidney. This can
6 result in infection of the urinary tract of the patient,
7 which may necessitate a further treatment. As the
8 patient will need to remain in the hospital for longer
9 than would otherwise be necessary, the cost of caring for
10 the patient is greatly increased and valuable resources
11 are wasted on treating what is, essentially an avoidable
12 situation.

13

14 However in busy hospitals or care homes, it may be
15 difficult for the nursing staff to check the catheter or
16 drip bags as often as would be desirable. The need to
17 visit every patient's bed to check the contents of the
18 bag on a regular basis uses up valuable staffing time. A
19 further problem lies in the fact that, at present,
20 catheter bags are often stored under the bed of the
21 patient. This adds to the inconvenience to nursing staff
22 who must actively go around every bed and pull out the
23 bag to check its contents.

24

25 It is therefore an object of the present invention to
26 provide an apparatus, which can be used to hold a
27 catheter or drip bag in a position where the contents can
28 be easily viewed. An associated object of the present
29 invention is to provide an apparatus, which can be used
30 to detect when the contents of the catheter or drip bag
31 reach a certain level and which provides an indication or
32 warning when the bag requires emptying or filling.

33

1 According to a first aspect of the present invention,
2 there is provided apparatus capable of indicating when
3 the contents of a medical bag reach a certain level, the
4 apparatus comprising indicator means, and a first and
5 second component, wherein the first component has
6 attachment means for holding the medical bag and is
7 adapted to move relative to the second component as the
8 contents of the medical bag change, wherein movement of
9 the first component activates the indicator means.

10

11 Typically the medical bag is of the type commonly known
12 as a catheter bag or a drip bag.

13

14 Preferably the first and second components are hollow
15 tubulars.

16

17 Preferably, as the contents of the medical bag fill, in
18 the case of a catheter bag, or empty, in the case of a
19 drip bag, the first component moves in a substantially
20 vertical direction relative to the second component.

21

22 The first and second components may be manufactured from
23 a metal or plastics material. Preferably, the hollow
24 tubulars are manufactured from stainless steel.

25

26 Preferably the first and second components are arranged
27 such that the first component is positioned above and
28 engages with the second component.

29

30 In a preferred embodiment the lowermost region of the
31 first component is positioned substantially within the
32 uppermost region of the second component. In order to
33 facilitate this the diameter of at least the lowermost

1 region of the first component may be smaller than the
2 diameter of at least the uppermost region of the second
3 component.

4

5 In an alternative embodiment the lowermost region of the
6 first component is positioned substantially over the
7 uppermost region of the second component. In order to
8 facilitate this the diameter of at least the lowermost
9 region of the first component may be larger than the
10 diameter of at least the uppermost region of the second
11 component.

12

13 Preferably a compression spring is located within the
14 second component.

15

16 Preferably one of either the first or second component
17 contains a magnetic array. Typically, the other of the
18 first or second component contains a magnetic detector or
19 sensor.

20

21 Preferably the magnetic detector or sensor is a read
22 switch.

23

24 Preferably the first component makes contact with the
25 compression spring. Typically the first component sits
26 on the compression spring.

27

28 Preferably the compression spring is calibrated.

29

30 Preferably the indicator means is activated when the
31 magnetic detector or sensor comes into proximity with the
32 magnetic array.

33

1 The indicator means may comprise one or more indicator
2 lights or an audible signal.

3

4 In one embodiment the magnetic detector or sensor and
5 magnetic array are brought into proximity with each other
6 as the bag fills. As it fills, the weight of the bag
7 moves the first component in a substantially downward
8 direction on the compression spring located in the second
9 component. This causes the magnetic detector or sensor
10 to come into proximity with the magnetic array.

11

12 In an alternative embodiment the magnetic detector or
13 sensor and magnetic array are brought into proximity with
14 each other as the bag empties. As it empties, the
15 reduction in weight of the bag moves the first component
16 in a substantially upward direction on the compression
17 spring located in the second component. This causes the
18 magnetic detector or sensor to come into proximity with
19 the magnetic array.

20

21 The indicator means may be battery powered.

22

23 Optionally the indicator means is located on one or both
24 of the upper or lower components. In an alternative
25 embodiment the indicator means is located in a remote
26 location to the apparatus.

27

28 The apparatus may also comprise a third component. The
29 indicator means may be located on the third tubular
30 component. Where the indicator means is battery
31 operated, battery access may be positioned in the third
32 tubular component.

33

1 Preferably the apparatus is free standing. To facilitate
2 standing, the lower component may have a base. The base
3 may have a plurality of feet.

4

5 An example embodiment of the present invention is
6 described with reference to the following Figures, in
7 which:

8

9 Figure 1 is a pictorial view of the apparatus of the
10 present invention;

11

12 Figure 2 is an engineering drawing of the apparatus from
13 the side;

14

15 Figure 3 is an engineering drawing of the apparatus
16 viewed at an angle;

17

18 Figure 4 is an engineering drawing of the apparatus from
19 the back;

20

21 Figure 5 is an engineering drawing of the apparatus from
22 below;

23

24 Figure 6 is an exploded view of the apparatus, and

25

26 Figure 7 illustrates the tubular used in connection with
27 a drip bag.

28

29 Referring firstly to Figure 1, the apparatus for holding
30 a medical bag such as a catheter or drip bag is generally
31 depicted at 1. The apparatus comprises a first lower
32 component 2, which in the depicted embodiment is
33 comprised of a hollow tubular, mounted on a base 3. The

1 base 3, supports the apparatus and may also have feet 4
2 to improve grip. The feet may be manufactured from a
3 rubber material. A second upper component 5 is also
4 comprised of a hollow tubular. In the depicted
5 embodiment the lowermost part of the upper component is
6 inserted or positioned in at least the uppermost part of
7 the lower component 2. At least the lower portion of the
8 upper component is generally smaller in diameter than at
9 least the upper portion of the lower component and as a
10 result the upper component can move relative to the lower
11 component in the direction indicated by arrow A. Both
12 parts 2 and 5 are manufactured from stainless steel,
13 which has advantageous hygienic properties. However it
14 is recognised that the apparatus may also be manufactured
15 from other metal materials or plastic. The upper and
16 lower component may be welded or secured by other means
17 which further aids hygiene. The base 3, may be
18 manufactured from aluminium. The components and base may
19 also be coated by a sterile coating to increase hygiene
20 and to allow the apparatus to be moved from ward to ward
21 without the risk of cross infection. The base of the
22 apparatus may optionally have wheels to permit easy
23 movement.

24

25 Figures 2 to 5 show the apparatus from a number of
26 different angles.

27

28 The upper component can move in a vertical direction
29 relative to the lower component, as illustrated by arrow
30 A, due to the inclusion of a compression spring 6 which
31 in the depicted embodiment is located within the lower
32 component. The upper component sits on the compression
33 spring. A magnetic array 11 is also contained within the

1 apparatus. In the depicted embodiment (Figure 6) the
2 magnetic array is located within the lower component,
3 although it in an alternative embodiment the magnetic
4 array may be located within the upper component. In the
5 depicted embodiment the magnetic array is provided as a
6 circular magnet cluster. Also located within the
7 tubulars and associated with the compression spring are
8 stop ring 9, and bushes 10. The apparatus will have 360°
9 rotational movement.

10

11 The apparatus also contains a magnetic sensor or detector
12 18 which may take the form of one or more read switches
13 (otherwise known as reed switches). Where the magnetic
14 array is located within the lower component the magnetic
15 sensor or detector will be located in the upper component
16 and vice versa.

17

18 The upper 5 component has a t-bar 7, on which are located
19 one or more attachment means 8. A standard catheter or
20 drip bag, of the type commonly used in hospitals or care
21 homes can be mounted on the apparatus using the
22 attachment means 8. The attachment means 8 may take the
23 form of pegs, clips or hooks.

24

25 In the depicted embodiment, indicator means 12 is
26 activated when the magnetic sensor or detector 18, which
27 in the depicted embodiment is located in the upper
28 component, comes into the proximity of the magnetic array
29 11, in the lower component. As the weight of the catheter
30 bag increases as it fills the upper component is moved in
31 a downward direction on the compression spring. This
32 causes the magnetic sensor or detector in the upper
33 component to move towards the magnetic array in the lower

1 component. In other words as the catheter bag fills,
2 and the volume of the contents of the catheter bag
3 increases, the increased weight of the bag will pull
4 upper component 5 in a downward direction towards lower
5 component 2 on compression spring 6, in the direction of
6 arrow B. It will be appreciated that the positioning of
7 the magnetic array and magnetic sensor or detector could
8 equally be reversed, such that the magnetic array is
9 located in the upper component and the magnetic sensor or
10 detector is located in the lower component.

11
12 When the magnetic array come into close proximity with
13 the magnetic detector or sensor the indicator means is
14 activated, which notifies nursing or care staff that the
15 contents of the bag have reached a particular level and
16 require emptying. The position of the read switch and
17 magnetic array within the components is such that this
18 will occur when contents of the bag reach a predetermined
19 quantity. Activation will typically occur through the
20 generation of an electric current, and the hollow
21 tubulars are adapted to receive one or more batteries.
22 The batteries may be standard or rechargeable. In an
23 example embodiment, using standard sized catheter bags
24 (2000 ml), activation when the contents of the bag reach
25 1800 ml. As many catheter bags can hold 2000ml of fluid,
26 activation of the indication means when the contents of
27 the bag reach 1800 ml gives the nursing or care staff
28 time to empty the bag before it becomes entirely full and
29 backflows into the associated tubing. However it should
30 be recognised that the calibration of the spring can be
31 changed, and that the apparatus is not limited to work at
32 these volumes. The apparatus may be adapted to activate

1 the indication means when the capacity of the bag is less
2 or more than 1800 ml depending on the situation.

3

4 In an alternative embodiment, where fluid (such as plasma
5 or saline) is being passed into the body, the weight of
6 the bag will gradually decrease as the medical bag
7 empties and the volume of the contents of the bag
8 decreases. In this embodiment the upper component 5 will
9 move in the direction of arrow C, as less weight is
10 exerted on compression spring 6. The magnetic array and
11 magnetic detector or sensor will be positioned within the
12 first and second components such that as the upper
13 component moves in direction C, they are brought into
14 proximity with each other. When the magnetic array comes
15 into close proximity with the magnetic detector or sensor
16 the indicator means is activated, to notify nursing or
17 care staff that the contents of the bag are low and it
18 requires filling.

19

20 It is also recognised that alternative embodiments of the
21 apparatus may be provided where activation of the
22 indicator means is effected by a method other than the
23 method which uses magnets and sensors depicted in the
24 Figures. For example in an alternative embodiment the
25 magnetic array and detector may be replaced by a simple
26 mechanical switch which is moved from an off to an on
27 position when the upper component moves to a
28 predetermined position relative to the lower component.
29 The switch may be located in either of the upper or lower
30 components and is moved to the on position when the upper
31 component reaches a certain predetermined position
32 relative to the lower component.

33

1 In the depicted embodiment, the indication means
2 comprises one or more warning lights 12 provided as one
3 or more LED lens. The warning lights are located on the
4 entire circumference of the tubular component to provide
5 360° visibility. Three warning lights of red, amber and
6 green, are provided in the depicted embodiment. These
7 will provide an escalating level of warning relating to
8 the contents of the bag. For example, using the Figures
9 given above, at 1600 ml the green light may be activated.
10 At 1700 ml the amber light may be activated and at 1800
11 ml the red light may be activated. The volume at which
12 the indicator is activated may be altered as desired.
13 This will give nursing staff an advance indication of how
14 full the catheter bag is. Alternatively, the indication
15 means may be flashing light. The indicating means may
16 also comprise a buzzer or some other audible signal. It
17 will be appreciated that the use of lights or buzzers are
18 particularly beneficial for use at night. The indicator
19 will de-activate once the bag is drained or replaced.
20
21 The apparatus may also comprise a third tubular component
22 as shown in Figure 7. The third tubular component 13
23 will typically have a first end 14 which can be attached
24 to the stand, and a second end 15 to which the catheter
25 or drip bag can be attached. The first end may be
26 attached to the attachment means 8 on the t-bar 7. The
27 tubular is hollow and can hold one or more batteries (not
28 shown). In this embodiment a tension spring is located
29 within the hollow tubular and an indicator means
30 typically being a LED lens 17 is provided on the tubular
31 body. The first and second ends typically carry hooks
32 16, clamps or the like which facilitate attachment to the
33 catheter or drip bag and stand. The indicator means will

1 be activated when the contents of the bag reach a certain
2 level and the weight the third component exerts on the
3 upper component sufficiently increases or decreases to
4 activate the indicator in the manner described above.
5
6 An indicator means may also be located in a remote
7 location, for example at a nursing station, so that
8 nursing and care staff can monitor all patients within a
9 ward without having to undertake a ward round. This will
10 greatly reduce the time spent by nursing staff monitoring
11 patients, as they will not need to attend individual beds
12 to check whether individual bags require emptying.
13
14 Further modifications and improvements may be
15 incorporated without departing from the scope of the
16 invention herein intended.

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